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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/629,614

07/30/2003

Won-Youl Choi

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6106

7590

03/30/2006

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EXAMINER

SCHINDLER, DAVID M

ART UNIT

PAPER NUMBER

2862

DATE MAILED: 03/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/629,614

Applicant(s)

CHOI ET AL.

Examiner

David Schindler

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 09 December 2005.  
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1 and 17-31 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1 and 17-31 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☒ The drawing(s) filed on 30 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 12/27/05.  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.  
5) ☐ Notice of Informal Patent Application (PTO-152)  
6) ☐ Other: \_\_\_\_\_.

### DETAILED ACTION

1. This action is in response to the communication received on 12/09/2005.

#### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1 and 17-31 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 1 now recites the first excitation coil, the first pick-up coil, and the first soft magnetic core are disposed on a first side of the printed circuit board and the second excitation coil, the second pick-up coil, and the second soft magnetic core are disposed on a second side of the printed circuit board on lines 15-18. However the Examiner notes that this appears to include matter not disclosed in the original disclosure. The Examiner notes that the first excitation coil, the first pick-up coil, and the first soft magnetic core do not appear to be have been disclosed on a first side of the printed circuit board. Similarly, the second excitation coil, the second pick-up coil, and the second soft magnetic core do not appear to have been disclosed on a second side of the printed circuit board. Please note that claim 1 states "A printed circuit integrated with a two-axis fluxgate sensor, comprising:" on lines 1-2. Therefore, it is not

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understood how the features of claim 1 can be on a first and second side of the device that they themselves comprise. Please note paragraph [0033] on pages 11-12 of applicant's specification along with figures 4A through 4L. Note the location of the features with respect to the dielectric substance (101).

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 17-31 recite the limitation "the rectangular ring" throughout the claims.

For example, see lines 2-3 of Claim 17. Note lines 3-4 of claim 1 and lines 9-10 of claim

1. There is insufficient antecedent basis for this limitation in the claims.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1 and 17-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fedeli et al. (6,690,164) embodiment one (FE1) in view of Fedeli et al. (6,690,164) embodiment two (FE2) and Glowacki et al. (herein referred to as "Glowacki") (6,251,834) and Kang et al. (herein referred to as "Kang") (2003/0169037).

The applied reference has a common inventor and assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it

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constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). This rejection might also be overcome by showing that the reference is disqualified under 35 U.S.C. 103(c) as prior art in a rejection under 35 U.S.C. 103(a). See MPEP § 706.02(I)(1) and § 706.02(I)(2).

As to Claim 1,

FE1 discloses a first magnetic core ((10a) in combination with (10b)) formed lengthwise in a first axial direction and forming a rectangular-ring (Figure 1A); a first excitation coil (12) formed of a metal film and wound around the first magnetic core; a first pick-up coil (14) formed of a metal film and wound around the first magnetic core and the first excitation coil; a second magnetic core formed lengthwise in a second axial direction, the second axial direction being perpendicular to the first axial direction and forming a rectangular-ring; a second excitation coil formed of a metal film and wound around the second magnetic core; and a second pick-up coil formed of a metal film and wound around the second magnetic core and the second excitation coil; and a single

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dielectric core (insulating material) (18) ((Figures 1A and 1B) and (Column 1, Lines 66-67) and (Column 2, Lines 1-32)).

FE1 does not explicitly disclose that the cores are soft magnetic cores, and the printed circuit board includes the first excitation coil, the first pick-up coil, and the first soft magnetic core are disposed on a first side of the printed circuit board and the second excitation coil, the second pick-up coil, and the second soft magnetic core are disposed on a second side of the printed circuit board.

FE2 discloses a soft magnetic core (FeNi) (Column 3, Line 7).

Glowacki discloses Feni has a greater tensile strength (Column 3, Lines 13-16).

It would have been obvious to a person of ordinary skill in the art to modify FE1 to include the cores are soft magnetic cores given the above disclosure and teaching of FE2 and Glowacki in order to have a core of greater tensile strength.

Kang discloses the printed circuit board includes the first excitation coil (2), the first pick-up coil (4), and the first soft magnetic core (1) are disposed on a first side of the printed circuit board (Figures 1 and 2) and the second excitation coil (2'), the second pick-up coil (4'), and the second soft magnetic core (1') are disposed on a second side of the printed circuit board ((Figures 1 and 2) and (Page 3, Paragraph [0037] / note permalloy on line 13)).

It would have been obvious to a person of ordinary skill in the art to modify FE1 in view of FE2 and Glowacki to include the printed circuit board includes the first excitation coil, the first pick-up coil, and the first soft magnetic core are disposed on a first side of the printed circuit board and the second excitation coil, the second pick-up

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coil, and the second soft magnetic core are disposed on a second side of the printed circuit board as taught by Kang in order to provide a weak-magnetic field sensor using a printed circuit board manufacturing technique which is simply constructed, easily manufactured, and reduced in manufacturing cost by simple circuit construction (Page 1, Paragraph [0013]).

As to Claim 17,

FE1 discloses each of the first and second magnetic cores includes four coplanar bars forming the rectangular ring ((Figures 1A and 1B) and (Column 2, Lines 15-32)).

As to Claim 18,

FE1 discloses each of the first and second excitation coils has a structure of winding at least two opposing sides of the rectangular ring in an axial direction and substantially in a solenoid pattern ((Figures 1A and 1B) and (Column 2, Lines 15-32)).

As to Claim 19,

FE1 discloses each of the first and second pick-up coils has a structure of winding the at least two opposing sides of the rectangular ring in an axial direction together and substantially in a solenoid pattern ((Figures 1A and 1B) and (Column 2, Lines 15-32)).

As to Claim 20,

FE1 discloses the first excitation and pickup coils and the second excitation and pick-up coils have a structure of winding the at least two opposing sides of the

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rectangular ring in an alternating fashion ((Figures 1A and 1B) and (Column 2, Lines 15-32)).

As to Claim 22,

FE1 discloses each of the first and second pick-up coils has a structure of winding the at least two opposing sides of the rectangular ring substantially in a solenoid pattern ((Figure 1A) and (Column 2, Lines 15-32)).

As to Claim 23,

FE1 discloses the first excitation coils and pick-up coils and the second excitation and pick-up coils have a structure of winding the at least two opposing sides of the rectangular ring in an alternating fashion ((Figures 1A and 1B) and (Column 2, Lines 15-32)).

As to Claims 21 and 24,

FE1 discloses each coil of the first and second excitation coils and each of the first and second pick-up coils is wound once and substantially in a zigzag fashion, such that the first and second excitation coils and the first and second pick-up coils face each other with the intervention of the rectangular ring therebetween ((Figure 1A) and (Column 2, Lines 15-32)).

8. Claims 25-31 are rejected under 35 U.S.C. 103(a) as being obvious over Fedeli et al. (6,690,164) embodiment one (FE1) in view of Fedeli et al. (6,690,164) embodiment two (FE2) and Glowacki et al. (herein referred to as "Glowacki")



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(6,251,834) and Kang et al. (herein referred to as "Kang") (2003/0169037) and in further view of Choi et al. (herein referred to as "Choi") (6,411,086).

The applied reference has a common inventor and assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). This rejection might also be overcome by showing that the reference is disqualified under 35 U.S.C. 103(c) as prior art in a rejection under 35 U.S.C. 103(a). See MPEP § 706.02(I)(1) and § 706.02(I)(2).

As to Claim 25,

FE1 in view of FE2 and Glowacki and Kang does not disclose each of the first and second excitation coils are wound around at least two opposing sides of the rectangular ring in an axial direction and substantially in a figure-eight pattern.

Choi discloses winding an excitation coil in a figure-eight pattern (Column 4, Lines 38-55).

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It would have been obvious to a person of ordinary skill in the art to modify FE1 in view of FE2 and Glowacki and Kang to include each of the first and second excitation coils are wound around at least two opposing sides of the rectangular ring in an axial direction and substantially in a figure-eight pattern given the above disclosure and teaching of Choi in order to have magnetic fluxes that are opposite to each other (Column 3, Lines 40-43).

As to Claim 26,

FE1 discloses each of the first and second pick-up coils has a structure of winding the at least two opposing sides of the rectangular ring in an axial direction together and substantially in a solenoid pattern ((Figures 1A and 1B) and (Column 2, Lines 15-32)).

As to Claim 27,

FE1 discloses the first excitation and pickup coils and the second excitation and pick-up coils have a structure of winding the at least two opposing sides of the rectangular ring in an alternating fashion ((Figures 1A and 1B) and (Column 2, Lines 15-32)).

As to Claim 28,

FE1 discloses each coil of the first and second excitation coils and each of the first and second pick-up coils is wound once and substantially in a zigzag fashion, such that the first and second excitation coils and the first and second pick-up coils face each other with the intervention of the rectangular ring therebetween ((Figure 1A) and (Column 2, Lines 15-32)).

As to Claim 29,

FE1 discloses each of the first and second pick-up coils has a structure of winding the at least two opposing sides of the rectangular ring in an axial direction and substantially in a solenoid pattern ((Figures 1A and 1B) and (Column 2, Lines 15-32)).

As to Claim 30,

FE1 discloses the first excitation and pickup coils and the second excitation and pick-up coils have a structure of winding the at least two opposing sides of the rectangular ring in an alternating fashion ((Figures 1A and 1B) and (Column 2, Lines 15-32)).

As to Claim 31,

FE1 discloses each coil of the first and second excitation coils and each of the first and second pick-up coils is wound once and substantially in a zigzag fashion, such that the first and second excitation coils and the first and second pick-up coils face each other with the intervention of the rectangular ring therebetween ((Figure 1A) and (Column 2, Lines 15-32)).

### ***Response to Arguments***

9. Applicant's arguments with respect to the pending claims have been considered but are moot in view of the new ground(s) of rejection.

With regard to line 1 of paragraph 2 of page 4 of the Remarks, the Examiner respectfully disagrees. FE1 discloses the magnetometers of current type are sensitive to the component of the field which is parallel to the substrate and consequently permit

the measurement along two orthogonal directions X and Y, provided that two identical micro-magnetometers are available on the same substrate, whose orientations are orthogonal (respectively X and Y) (see lines 18-24 of column 2 of FE1). Therefore, FE1 appears to disclose a two-axis fluxgate magnetometer. Similarly FE2 appears to disclose a three-axis fluxgate magnetometer (see lines 40-47 of column 2).

With regard to lines 3-5 of paragraph 2 of page 4 of the Remarks, the Examiner notes that while claim 1 recites a printed circuit board, the fabrication techniques of the printed circuit board of claim 1 are not recited or claimed.

With regard to lines 7-9 of paragraph 3 of page 4 of the Remarks, the Examiner respectfully disagrees. Claim 1 does not appear to recite that the excitation and pick-up coils are alternatively wound around the corresponding core.

With regard to lines 9-11 of paragraph 3 of page 4 of the Remarks, the Examiner respectfully disagrees. FE1 does disclose a parallel core structure. See Figures 1A and 1B, and lines 18-24 of column 2 of FE1. Furthermore, claim 1 does not appear to recite a parallel structure.

With regard to the last two lines of page 4 of the Remarks, and to lines 1-2 of page 5 of applicant's Remarks, the Examiner respectfully disagrees. Please see the above responses and the above art rejection.

With regard to paragraph 3 of page 6 of the Remarks, the Examiner respectfully disagrees. The Examiner notes that there does not appear to be anything mentioned in the Choi reference that destroys the combination of references in which the Choi reference is applied. Therefore, there does not appear to be a teaching away.

With regard to the first and second full paragraphs of page 8 of the Remarks, the Examiner respectfully disagrees. Please see the above responses and the above claim rejections.

***Conclusion***

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Schindler whose telephone number is (571) 272-2112. The examiner can normally be reached on M-F (8:00 - 5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Lefkowitz can be reached on (571) 272-2180. The fax phone

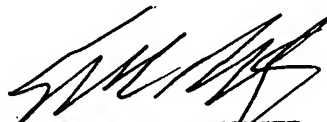
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number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
David Schindler  
Examiner  
Art Unit 2862

DS

  
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SUPERVISORY PATENT EXAMINER  
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